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3,260,565
**NOVEL IMIDAZOLIDINONES AND THEIR USE AS
 TEXTILE FINISHING AGENTS**

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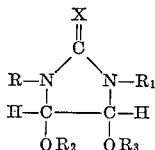
No Drawing. Original application Feb. 3, 1961, Ser. No. 86,864. Divided and this application Sept. 30, 1964, Ser. No. 406,651

5 Claims. (Cl. 8-116.3)

This application is a division of application Serial No. 86,864, filed February 3, 1961.

This invention relates to novel textile finishing agents and more specifically to novel 4,5-dihydroxy or 4,5-dialkoxy derivatives of 2-imidazolidinones or their corresponding thiones. Further, the invention relates to the process of imparting crease resistance by the use of these novel agents and to the crease resistant textile materials produced therewith.

Specifically, this invention relates to novel compounds having the following general formula:



where X is a member selected from the group consisting of oxygen and sulfur, R and R₁ are selected from the group consisting of lower alkyl, phenyl and substituted lower alkyl in which the substituting groups are cyano, carboxy, carbalkoxy or carboxamide, R₂ and R₃ are selected from the group consisting of hydrogen and lower alkyl; to their use as creaseproofing agents for cellulosic textile materials and to the cellulosic textile materials so treated or finished therewith.

As is well known, many thermosetting resinous textile finishing agents have been employed on cellulosic textile materials in order to impart crease resistance and dimensional stability thereto. These materials include the reaction products of formaldehyde with various amides such as urea, thiourea, ethylene urea, melamines, guanamines, and the like, whereby compounds containing methylol groups (-CH₂OH) are produced. The methylol groups on these compounds provide a means for attachment of the resinous finishing agents with the cellulose molecule and when two or more methylol groups are present, cross-linking between chains of cellulose is possible whereby the crease resistance and dimensional stability are imparted to such materials.

Many of these resins referred to above, sometimes identified as "aminoplast resins," are not without certain limitations and drawbacks. Thus, many of these resinous materials contain free formaldehyde during their preparation, storage, usage in textile finishing and in the subsequent storage of finished goods. In addition to the odor problems created by the presence of free formaldehyde, the dermatitic effect of free formaldehyde is also a well known problem.

Additionally, resins such as those identified above, when scorched, as when heated with an iron subsequent to chlorine bleaching, for example, chlorine bleaching of the type normally encountered in typical home laundering operations, tend to lose a substantial percentage of their initial tensile strength. This is presumably because of the liberation of retained chlorine and the degradative effect on tensile strength produced by the hydrochloric acid formed therefrom.

Additionally, aminoplast resins are normally manufactured and shipped as aqueous solutions, usually of from between 40 and 70% solids, requiring the shipment of

substantial amounts of water, frequently over substantial distances. Further, the aminoplast resins of the prior art can, in some instances, cause significant damage to direct dyes on cellulosic fabrics which normally is the result of the presence of free formaldehyde in the resinous products.

Accordingly, it is an object of this invention to provide a novel class of creaseproofing agents or textile finishing agents capable of imparting wrinkle resistance which may be characterized as being completely free of formaldehyde. The absence of free formaldehyde in the textile finishing agents of this invention eliminates the problems caused by formaldehyde, both as to odor and dermatitis, in the manufacture, storage, use and storage of fabrics finished therewith.

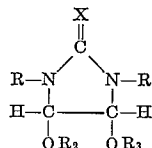
It is a further object of this invention to provide a novel class of textile finishing agents which are easily purified to crystalline solids and mobile liquids and can therefore be easily transported, thus minimizing or reducing the cost of transporting these agents.

It is a further object of this invention to provide a novel class of textile finishing agents which produce less damage to direct dyes on cellulosic fabrics than is usual with formaldehyde-containing aminoplasts.

It is a special object of this invention to provide a novel class of textile finishing agents which surprisingly produce minimal losses in tensile strength, even when compared with closely related homologous compounds.

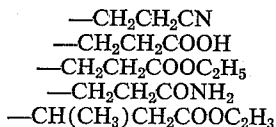
These and other objects and advantages of this invention will become more apparent from the detailed description thereof set forth hereinbelow.

In accordance with the present invention, novel compounds of the following general formula are prepared:



where X is a member selected from the group consisting of oxygen and sulfur, R and R₁ are selected from the group consisting of lower alkyl, phenyl and substituted lower alkyl and particularly substituted lower alkyls, wherein the substituting group is selected from the group consisting of cyano, carboxy, carbalkoxy and carboxamide, and R₂ and R₃ are selected from the group consisting of hydrogen and lower alkyl.

By "lower alkyl," as that term is employed herein, it is intended to include alkyl groups containing from 1 to 7 carbon atoms and preferably from 1 to 4 carbon atoms, which groups may be normal or branch chained. As examples of unsubstituted lower alkyl radicals, the following are illustrative: methyl, ethyl, propyl, isopropyl, butyl, isobutyl, tertiary butyl, n-pentyl and the like. Lower alkyl radicals substituted by cyano, carboxy, carbalkoxy or carboxamide are typified by such radicals as



and the like.

Compounds of the general formula where the R₂ and R₃ are hydrogen may be prepared by reacting a urea or thiourea with glyoxal under such conditions that both carbonyl groups of the dialdehyde react with amide groups of the urea or thiourea.

The ureas and thioureas which may be used include urea, 1-methylurea, 1-ethylurea, 1-n-propylurea, 1-n-butylurea, 1,3-dimethylurea, 1,3-diethylurea, 1,3-di-

propylurea, 1,3-di-n-butylurea, 1-methyl-3-ethylurea, 1,3-di-sec-butylurea, 1-allylurea, 1,3-diallylurea, 1-phenylurea, 1,3-diphenylurea, 1,3-dibenzylurea, etc., and the corresponding thioureas. Furthermore, the substituted ureas may have substituents on the alkyl or aryl groups which are non-reactive under the conditions of the reaction.

Where, in the compounds of the general formula, R_2 and R_3 are lower alkyl, these are made by reacting the corresponding compounds where R_2 and R_3 are hydrogen, with appropriate lower alkyl alcohols under acidic conditions. Any of the strong acids normally employed in the alkylation or etherification of amide-formaldehyde condensates or aminoplast resins may be employed. Such acids include the strong mineral acids, such as sulfuric, hydrochloric, nitric and the like. Normally, sufficient acid is employed to produce a pH below 4. Suitable alcohols may be any of the lower alcohols referred to above and may include methanol, ethanol, the propanols, the butanols and the like. Alkylation is normally carried out at a temperature of between about 0° and about 50° C. although preferably at between about 15° C. and about 30° C. At temperatures less than 0°, the reaction is normally too slow and at temperatures above 50° C. the danger of polymerization is present. The time required for the reaction is in general inversely proportional to the temperature and within the preferred temperature range of from 15° C. to 30° C. times of from 10 to about 2 minutes will normally be employed. For alkylation it is preferred that at least 2 moles of alcohol be employed if full alkylation is to be effected and substantial excesses are desirable in that they function as solvent for the reaction.

The ureas or thioureas and glyoxal are normally reacted in stoichiometric amounts, although slight excesses of either of the reactants may be employed. This reaction may be carried out at room temperature (20–30° C.) although temperatures from between 0 and 100° C., and preferably 15°–70° C., may be employed. The reaction may be carried out at atmospheric pressure, sub-atmospheric pressure or superatmospheric pressure for times sufficient to complete the reaction, which may be determined by free glyoxal determination.

Those compounds of the general formula in which R and R_1 are lower alkyl substituted by cyano, carboxy, carbalkoxy or carboxamide groups are typified by compounds in which R and R_1 radicals are as identified above, i.e., $-\text{CH}_2\text{CH}_2\text{CN}$, $-\text{CH}_2\text{CH}_2\text{COOH}$, and the like. These compounds may be prepared by reacting a corresponding compound of the general formula where R and R_1 are hydrogens, with an α,β -unsaturated aliphatic nitrile, acid, ester or amide such as acrylonitrile, acrylic acid, acrylamide, methacrylic acid, ethyl acrylate, and the like. In this reaction it is advantageous for the R_2 and R_3 to be lower alkyl groups. Such reactions are preferably carried out at a temperature of from 45 to 65° C., though temperatures down to room temperature (25–30° C.) and lower may be employed with longer reaction times required. Temperatures higher than 65° C. may be employed but polymerization may occur at higher temperatures. Such reactions are usually carried out in an inert solvent and preferably an inert polar solvent such as pyridine, quinoline, dioxane and the like.

As noted above, the principal end use contemplated for the novel agents of this invention is as textile finishing agents to impart wrinkle resistance and dimensional stability to cellulose containing textile materials.

Quite surprisingly, the compounds of this invention have demonstrated themselves to be dramatically superior to seemingly closely related homologous compounds, i.e., 4,5-dihydroxy-2-imidazolidinone (general formula hereinabove wherein all R 's are hydrogen) in chlorine retention and the damage to textile materials resulting therefrom. This aspect of the present invention will be demonstrated more fully hereinafter.

By the term "cellulose textile material," as that term

and similar terms are employed herein, it is meant fibers, yarns, filaments, formed fabrics, whether woven or non-woven, felted or otherwise formed, containing at least 50% of cellulose fiber prepared from cotton, rayon, linen, flax and other cellulosic materials. These cellulosic materials may be employed in combination with other non-cellulosic materials, as for example, they may be blended with other natural or synthetic fibers, for example, wool, nylon, acrylic fibers, polyester fibers and the like. The compounds or textile finishing agents of this invention may be applied to cellulosic textile materials by any conventional techniques, such as immersion, padding, spraying and the like, followed where necessary by squeezing, hydroextraction or similar processes in order to affix the desired amount of solids on the fabric.

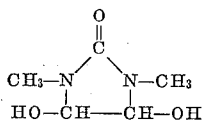
The method of application should be such that from about 1 to about 25% and in some instances higher amounts of the product of this invention based on the weight of the fabric are deposited thereon. Within certain limits, the amount of agent applied depends upon the particular type of fabric being treated. Thus, when treating fabric consisting of fibrous cellulosic materials, the concentration of the order of about 1 to 25% and more particularly from 3 to 10% solids, based on the dry weight of the fabric, may be employed.

The catalyst or accelerator employed is an acidic type catalyst and may be a free acid, acid salt, alkanolamine salt, metal salt and the like of the type well known to those in the textile finishing art. The concentration of catalyst employed may range from about 0.1 to about 25% or higher, based on the weight of the solids, depending upon the particular catalyst type employed. Thus, for example, from between about 0.1% and about 10% of a free acid such as phosphoric, tartaric, oxalic or the like may be employed, while in the case of ammonium chloride amounts of from between 0.5 and about 10% are used. In the case of amine salts including alkanolamine salts, such as diethanolamine hydrochloride, from about 1 to about 10% are most useful, while with respect to salts such as magnesium chloride amounts of from between about 5 and 25% have been successfully employed. In addition to magnesium chloride, zinc nitrate, aluminum chloride and other known conventional metal salts are normally employed in amounts corresponding to between 5 and 25% based on the weight of the solids.

Following the application of the agent and curing catalyst to the textile fabric, the material is subjected to drying and curing operations in order to effect wrinkle resistance and shrinkage control thereon. The drying and curing operation may be carried out in a single step or in separate steps. The temperatures at which the drying and curing operations are effected vary widely and are influenced to some extent by the type of catalyst employed. Normally, the range of temperature extends from about 180° F. to about 450° F. or even higher. Generally speaking, the time of the drying and/or curing operation is inversely proportional to the temperature employed and of course is influenced by whether or not separate or combined drying and curing steps are employed. Generally, when drying and curing is carried out in a combined operation a time of from about one minute to about 10 minutes may be employed at temperatures from 450 to 250° F., respectively. When the fabric has been dried preliminary to curing, curing times of the order of 5 minutes to about ¼ minute at a temperature of from between 250 and 450° F., respectively have been successfully employed.

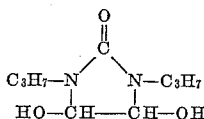
In order that the present invention may be more fully understood, the following examples are given primarily by way of illustration. No specific details or enumerations contained therein should be construed as limitations on the present invention except insofar as they appear in the appended claims. All parts and percentages are by weight unless otherwise specifically designated.

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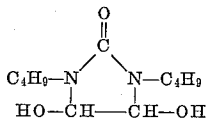
Example 1.—4,5-dihydroxy-1,3-dimethyl-2-imidazolidinone

A mixture of 105 parts (0.6 mole) of 30% glyoxal, with the pH adjusted to 7.0 by adding sodium hydroxide, and 44 parts (0.5 mole) of 1,3-dimethylurea is stirred at room temperature for several hours. Concentration of the solution in vacuo gives a precipitate which is filtered off and dissolved in methanol. Concentration of this solution gives a precipitate which may be separated by filtration. The product, after purification by dissolving in methanol and adding petroleum ether, has a melting point of about 129–131° C. (decomposition).

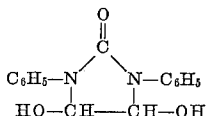
Analysis.—Calculated for $\text{C}_5\text{H}_{10}\text{N}_2\text{O}_3 \cdot \frac{1}{2} \text{H}_2\text{O}$: C, 38.8; H, 7.09; H_2O , 5.9. Found: C, 38.9; H, 6.91; H_2O , 6.0.

Example 2.—4,5-dihydroxy-1,3-di-n-propyl-2-imidazolidinone

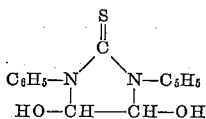
The procedure of Example 1 is followed substituting 72 parts of 1,3-di-n-propylurea for the 44 parts of 1,3-dimethylurea.

Example 3.—4,5-dihydroxy-1,3-diisobutyl-2-imidazolidinone

The procedure of Example 1 is followed substituting 86 parts of 1,3-diisobutylurea for the 44 parts of 1,3-dimethylurea.

Example 4.—4,5-dihydroxy-1,3-diphenyl-2-imidazolidinone

A reaction mixture of 21.2 parts (0.1 mole) of 1,3-diphenylurea in 200 parts of dioxane and 17.5 parts (0.1 mole) of 30% glyoxal of pH 7.0 is stirred at room temperature for about 30 minutes and then is heated at the reflux temperature for about 45 minutes. The reaction solution, after cooling and filtering, is evaporated to dryness and the residue is dissolved in ethanol. The product obtained by cooling the solution is separated by filtration and is purified by crystallization from ethanol.

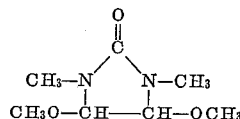
Example 5.—4,5-dihydroxy-1,3-diphenyl-2-imidazolidinethione

A solution of 22.8 parts (0.1 mole) of thiocarbanilide and 17.6 parts (0.1 mole) of 76% glyoxal in approximately 95 parts of a 50:50 mixture of tetrahydrofuran and water, with the pH adjusted to 7.5 by the addition of sodium hydroxide, is refluxed for 1 hour. The liquid portion of the reaction mixture, after decantation from the solid portion, when cooled deposits the desired product having a melting point of 176–178° C. An additional amount of the product is obtained by crystallization of the

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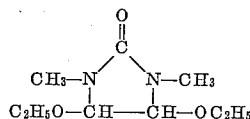
solid portion of the reaction mixture from a dioxane-water mixture.

Analysis.—Calculated for $\text{C}_{15}\text{H}_{14}\text{N}_2\text{O}_2\text{S}$: C, 62.9; H, 4.93; N, 9.78. Found: C, 63.0; H, 4.79; N, 9.59.

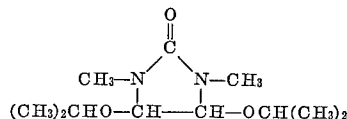
Example 6.—4,5-dimethoxy-1,3-dimethyl-2-imidazolidinone

A solution of 10 parts of 1,3-dimethyl-4,5-dihydroxy-2-imidazolidinone in 160 parts of methanol is acidified with 1.2 parts of concentrated hydrochloric acid. After the solution has been stirred at 20–25° C. for about 5 minutes, the solution is neutralized by adding about 2 parts of barium hydroxide. The filtered solution is then distilled to remove the alcohol, and the residue is taken up with ether. After filtering and evaporating the ether, the residue is distilled in vacuo, and the product boiling at 84–85° C. under a pressure equivalent to 1 mm. of mercury.

Analysis.—Calculated for $\text{C}_7\text{H}_{14}\text{N}_2\text{O}_3$: C, 48.3; H, 8.1. Found: C, 48.2; H, 8.2.

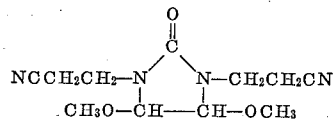
Example 7.—4,5-diethoxy-1,3-dimethyl-2-imidazolidinone

This product may be prepared by the procedure of Example 6 with the substitution of an equal amount of ethanol for the methanol. The product boils at 100–104° C. under a pressure equivalent to 2 mm. of mercury.

Example 8.—4,5-diisopropoxy-1,3-dimethyl-2-imidazolidinone

A slurry of 73 parts (0.5 mole) of 1,3-dimethyl-4,5-dihydroxy-2-imidazolidinone in 125 parts of isopropanol is acidified by the gradual addition of about 3.7 parts of 96% sulfuric acid. After a 15-minute period of stirring at room temperature, the pH of the solution is adjusted to between 7 and 8 with 50% aqueous sodium hydroxide. The solution is filtered and distilled in vacuo. The product boils at about 98–105° C. under a pressure equivalent to 0.1 mm. of mercury.

Analysis.—Calculated for $\text{C}_{11}\text{H}_{22}\text{N}_2\text{O}_3$: C, 57.4; H, 9.55; N, 12.2. Found: C, 57.3; H, 9.30; N, 12.4.

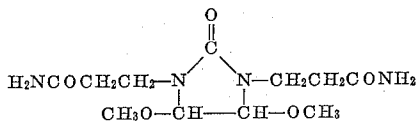
Example 9.—1,3-bis(2-cyanoethyl)4,5-dimethoxy-2-imidazolidinone

To a solution of 1.46 parts of 4,5-dimethoxy-2-imidazolidinone in about 5 parts of pyridine at 25° C., there is added over about 2 minutes 1.61 parts of acrylonitrile, the temperature being allowed to rise at will to about 45° C. After the reaction mixture has been stirred for 2 hours without supplemental heat, 5 parts of pyridine are added, the solution concentrated in vacuo, and the precipitate is separated by filtration. The product after crystallization from methanol melts at about 83–85° C.

Analysis.—Calculated for $\text{C}_{11}\text{H}_{16}\text{N}_4\text{O}_3$: OCH_3 , 24.6; N, 22.2. Found: OCH_3 , 24.7; N, 22.1.

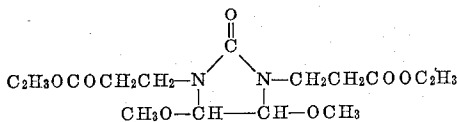
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Example 10.—1,3-bis(2-carbamoyl ethyl)4,5-dimethoxy-2-imidazolidinone



This product is prepared by the procedure of Example 8 by substituting the equivalent amount of acrylamide for the acrylonitrile.

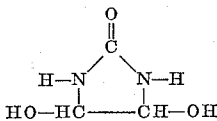
Example 11.—1,3-bis(2-carbethoxymethyl)4,5-dimethoxy-2-imidazolidinone



This product is prepared by the procedure of Example 8 by substituting the equivalent amount of ethyl acrylate for the acrylonitrile.

Compounds closely related to the novel compounds of this invention are prepared in accordance with Examples 12 and 13 hereinafter and subsequently compared therewith in application properties in order to point up the unexpected merit of the compounds of this invention as textile finishing agents.

Example 12.—4,5-dihydroxy-2-imidazolidinone



After the pH of 1070 parts (5.5 moles of 30% aqueous

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water, and the resulting solution upon cooling deposits a precipitate of white crystals which melt at 115–118° C.

Analysis.—Calculated for $\text{C}_5\text{H}_{10}\text{N}_2\text{O}_3$: C, 41.1; H, 6.90. Found: C, 40.9; H, 6.63.

Example 14

A. Solutions were prepared containing 1.2%, 3.0%, 6.0%, 9.0% and 12.0% of the product of Example 12. The solutions also contained 10% of zinc nitrate on the weight of the resin solids in the bath.

B. Similar solutions were also prepared using the product of Example 1.

The solutions were applied to 80 x 80 cotton percale by padding with a wet pick-up of approximately 85% on the weight of the fabric. The fabrics were dried at 225° F. for 2 minutes and the resin was cured on the fabric at 350° F. for 1.5 minutes. The treated fabrics contained the amount of resin shown in Table I.

The wrinkle recovery of the treated fabric was measured on a Monsanto wrinkle recovery tester following the tentative method 66–1959 described on page 171 of the 1959 Technical Manual and Yearbook of the American Association of Textile Chemists and Colourists, vol. 35.

The chlorine retention test was carried out by the Tentative Test Method 92–1958 described on page 130 of the 1959 Technical Manual and Yearbook of the American Association of Textile Chemists and Colourists, vol. 35.

The "Sanforized washes" were carried out at 212° F. in an automatic washing machine by the procedure described under Standard Test Method 91–1958 on page 133 of the above reference.

The results of the chlorine retention test described above are set forth in Table I hereinbelow.

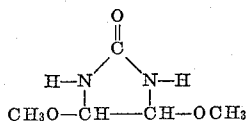
TABLE I

	Percent Resin Solids on Fabric	Initial Tensile Strength (Lb.)	Chlorine Retention Test							
			Tensile Strength (Lb.)					5 Sanforized washes		Initial Wrinkle Recovery (W+F)
			Initial Scorech	Cl ₂ Scorech	Percent Loss	Initial	Cl ₂	Percent Loss		
A	1	84	85	0	100	89	0	100	196	
	2.5	65	54	0	100	68	0	100	243	
	5	54	41	0	100	54	0	100	256	
	7.5	49	46	0	100	57	0	100	265	
	10	52	43	8	81	52	0	100	264	
B	1	103	90	83	8	93	94	0	181	
	2.5	77	69	67	3	75	72	4	216	
	5	69	61	59	3	67	68	0	242	
	7.5	64	64	62	3	64	62	3	256	
	10	62	61	61	0	66	64	3	256	
	(¹)	111	103	105	0	101	57	44	162	

¹ Untreated fabric.

glyoxal) has been adjusted to 7.0 with aqueous sodium hydroxide, 500 parts (8.35 moles) of urea are added at room temperature. The resulting solution, after standing at room temperature, is concentrated in vacuo, and the product which separates during the concentration is separated by filtration. The product is washed with methanol and purified by crystallization from 40% methanol.

Example 13.—4,5-dimethoxy-2-imidazolidinone



A solution of 10 parts (0.0847 mole) of 4,5-dihydroxy-2-imidazolidinone in 160 parts of methanol is acidified with 1.2 parts of concentrated hydrochloric acid. After about 5 minutes, the solution is neutralized with about 1.9 parts of barium hydroxide octahydrate and evaporated to dryness. The residue is extracted with 10 parts of hot

The product of Example 1 produces no significant strength loss due to chlorine retention, while in the case of the product of Example 12 the strength loss due to chlorine retention is extreme. This difference is indeed surprising in view of the close relationship between the two compounds.

Example 15

A. Solutions were prepared containing 1.2%, 3.0%, 6.0%, 9.0% and 12.0% of the product of Example 6. The baths also contained 10% of zinc nitrate on the weight of the resin solids in the bath.

B. A similar solution was also prepared containing 6.0% of the product of Example 13.

The solutions were applied to 80 x 80 cotton percale by padding with a wet pick-up of approximately 85% on the weight of the fabric. The fabrics were dried at 225° F. for 2 minutes and the resin was cured at 350° F. for 1.5 minutes. The treated fabrics contained the amount of resin shown in Table II.

The wrinkle recovery and tensile strength of the treated fabrics was measured by the procedure described in Example 14.

The washes under wrinkle recovery were carried out as in Example 14.

The chlorine retention tests and the "Sanforized washes" were carried out by the procedure described in Example 14.

The results of the tests are shown in Table II.

TABLE II

	Percent Resin Solids on Fabric	Initial Tensile Strength (Lb.)	Chlorine Retention Test							
			Tensile Strength (Lb.)				5 Sanforized washes			Initial Wrinkle Recovery (W+F)
			Initial Scorch	Cl ₂ Scorch	Percent Loss	Initial	Cl ₂	Percent Loss		
A	1	98	92	91	1	89	96	0	169	
	2.5	82	71	76	0	80	78	3	202	
	5	77	71	63	11	73	72	1	219	
	7.5	69	71	67	6	75	71	5	239	
	10	75	64	68	0	65	67	0	245	
B	5	57	47	0	100	58	0	100	227	
	(1)	111	103	105	0	101	57	44	---	

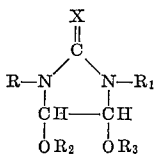
¹ Untreated fabric.

These results show that surprisingly the product of Example 6 is far superior to the product of Example 13 with respect to the amount of damage caused by chlorine retention.

The textile finishing agents of this invention may be employed alone or in combination with other creaseproofing resins and in particular with aminoplast textile finishing resins, as for example, the melamine-formaldehyde resins, guanamine-formaldehyde resins, and their alkylated or etherified derivatives. Thus, for example, the agents of this invention may be combined with the melamine-formaldehyde resins which are described in U.S. Patent No. 2,197,357 and U.S. Patent No. 2,529,856. Additionally, they may be combined with the various cyclic ureas, as, for example, ethylene urea, propylene urea, including the 1,2- and 1,3-propylene ureas and their homologues and corresponding thio derivatives and the thiois amides such as are described in U.S. Patent No. 2,887,408. Suitable guanamine-formaldehyde condensates of the type contemplated for use with the agents of this invention are those described in U.S. Patent No. 2,887,409. Additionally, the agents of this invention may be combined or employed with ureas such as are described in U.S. Patent No. 2,373,135 and various polyepoxide resins having epoxy equivalents greater than 1, as for example those described in U.S. Patent No. 2,730,427, U.S. Patent No. 2,752,269 and U.S. Patent No. 2,794,754. Further, the textile finishing agents of this invention may be employed with other agents or auxiliaries, as for example, softeners, lubricants, odorants and the like.

I claim:

1. A method for creaseproofing cellulosic textile materials which comprises treating said materials with a compound of the formula

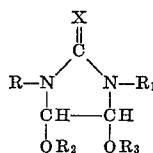


where R and R₁ are selected from the group consisting of lower alkyl, substituted lower alkyl, wherein the sub-

stituting group is cyano, carboxy, carbalkoxy and carbamide, and phenyl, and where R₂ and R₃ are selected from the group consisting of hydrogen and lower alkyl, and X is selected from the group consisting of oxygen and sulphur and a curing accelerator therefor and thereafter curing said agent on the textile material by the application of heat.

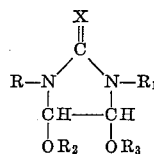
2. Creaseproofed cellulosic textile materials having

thereon from 3 to 10% of a heat cured compound of the following formula



where R and R₁ are selected from the group consisting of lower alkyl, substituted lower alkyl, wherein the substituting group is cyano, carboxy, carbalkoxy and carbamide, and phenyl, and where R₂ and R₃ are selected from the group consisting of hydrogen and lower alkyl, and X is selected from the group consisting of oxygen and sulfur.

3. Creaseproofed cellulosic textile materials having thereon a heat cured compound of the following formula



where R and R₁ are selected from the group consisting of lower alkyl, substituted lower alkyl, wherein the substituting group is cyano, carboxy, carbalkoxy and carbamide, and phenyl, and where R₂ and R₃ are selected from the group consisting of hydrogen and lower alkyl, and X is selected from the group consisting of oxygen and sulfur.

4. A method for creaseproofing cellulosic textile material which comprises treating said material with 1,3-dimethyl-4,5-dihydroxy-2-imidazolidinone and a curing accelerator therefor, and thereafter curing said imidazolidinone on the textile material by the application of heat.

5. Creaseproofed cellulosic textile material having thereon heat-cured 1,3-dimethyl-4,5-dihydroxy-2-imidazolidinone.

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